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oint Doctrine and Concepts Centr

UK Joint Doctrine & Concepts Centre

UK CDE Update

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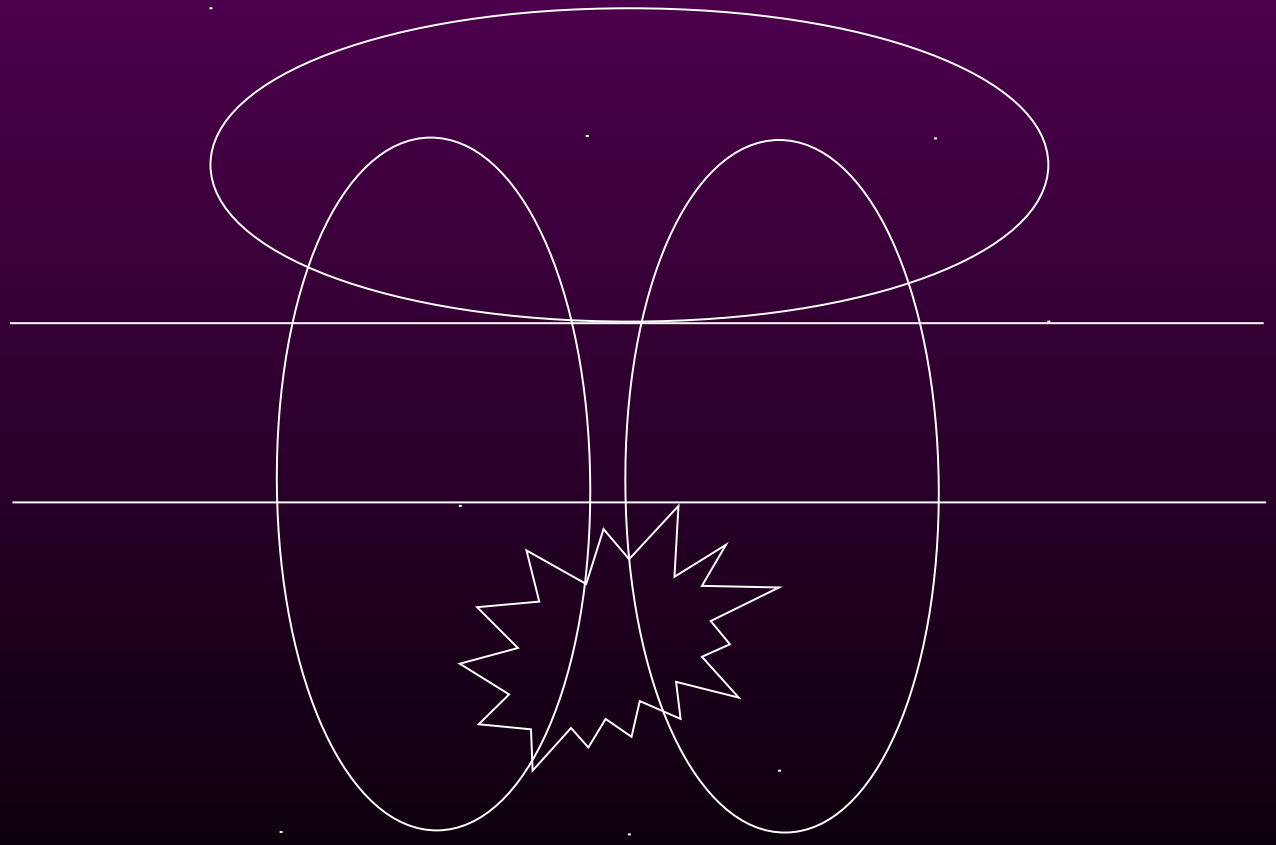
Structure

- Assumption
- Background (EBO)
- Command
- Inform
- Operate

Assumption

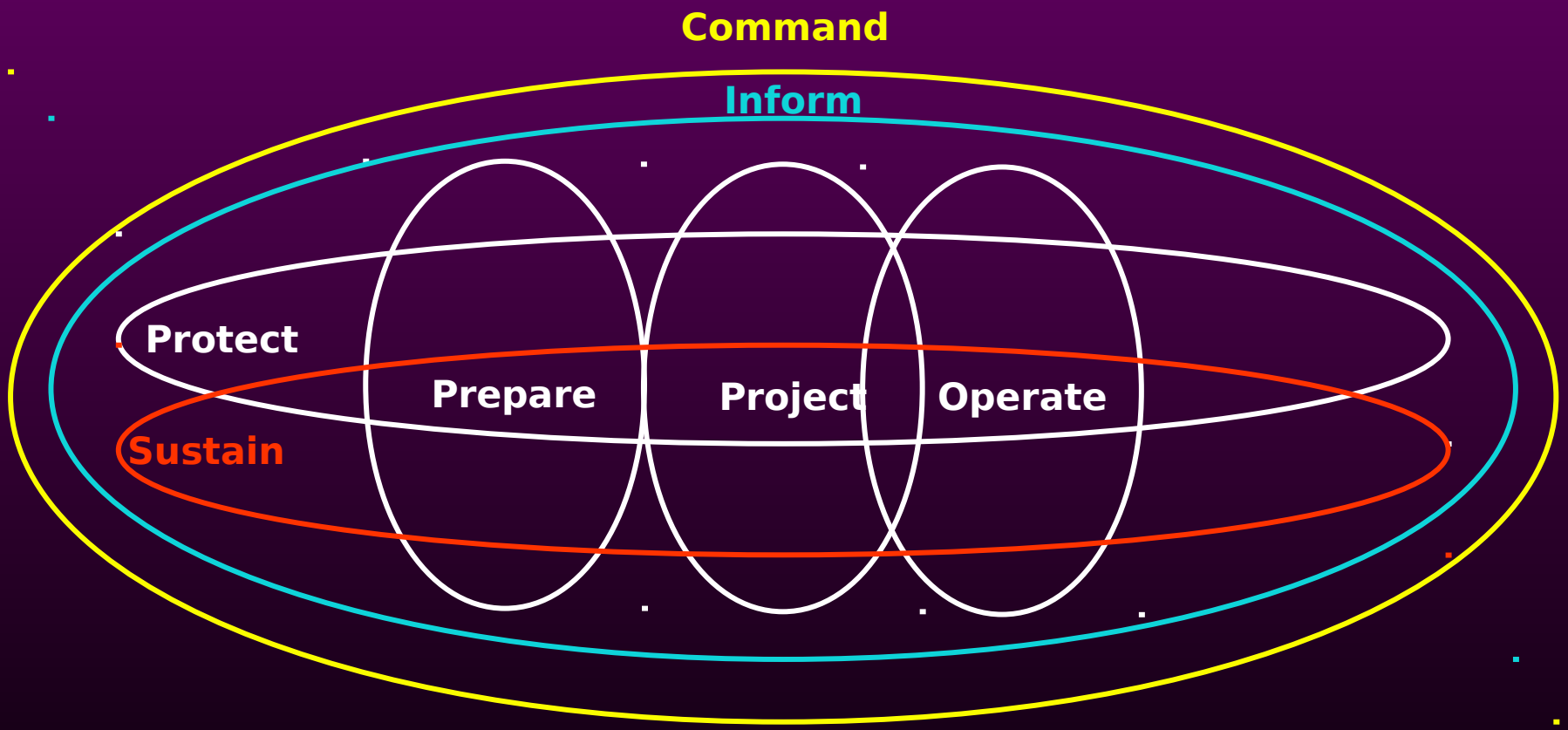
- Hayes Alberts
  - Cognitive - Information - Physical Domains



Background

- Defence Capabilities Framework
- Future Environment
  - Battlespace paradigm
- Future Operations
  - Effects Based Operations
  - NEC
- Future Ethos

The Defence Capability Framework



DCF Capability Areas - 1

- Command
  - Understand
  - Plan
  - Integrate
  - Control
- Inform
  - Gain
  - Analyse
  - Exploit
  - Disseminate
  - Maintain
- Operate
  - Manage Battlespace
  - Manoeuvre
  - Apply Effects

Future Environment

Seven Dimensions of the Security and Defence Environment

- Physical
- Technological
- Economic
- Legal
- Social
- Political
- Military

Future Environment - Conflict

- Lower risk of large-scale armed conflict
- Threat increasingly from terrorists and other non-state actors using asymmetry
- Globalisation means effects lead rapidly to unintended consequences
- Adversaries will lack traditional nodes and CoGs
- Battlespace no longer Jominian or geometric
  - New paradigm required

The Future Environment

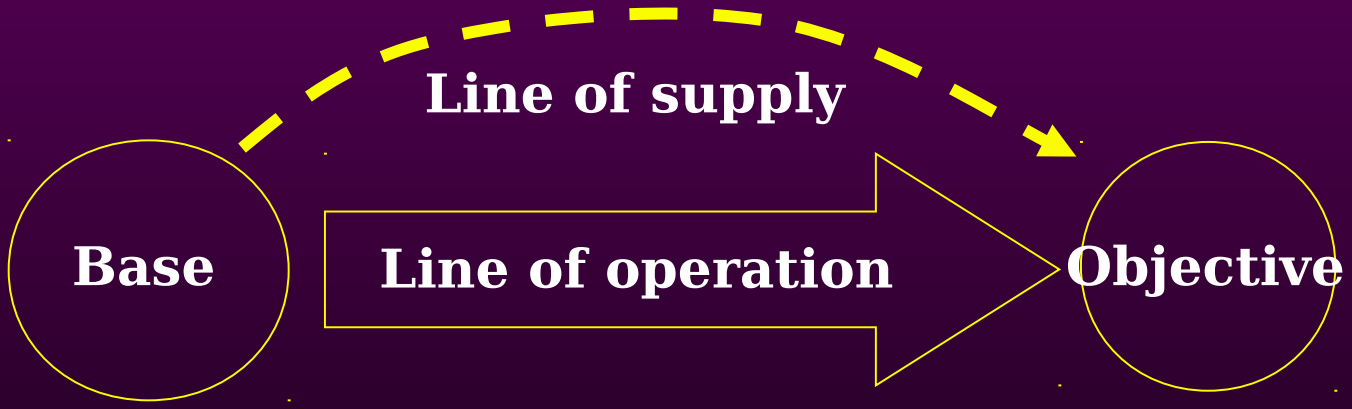
- Non-linear
- Non-contiguous
- Non-nodal, often without classic centres of gravity
- Globalisation
- Emerging technologies
- Coalitions of the willing
- Complex

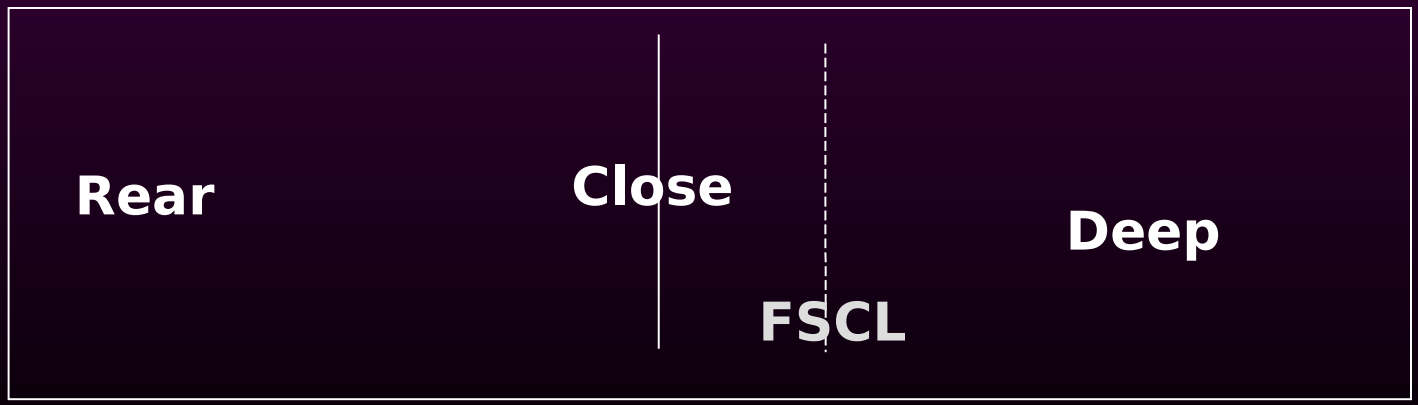
Future Operations

- Effects Based
- Lexicon of Effects
  - *Encourage, reassure*
  - *Influence, persuade, dissuade*
  - *Prevent, deter, coerce*
  - *Disrupt, isolate, degrade*
  - *Disable, destroy*
- EBP follow-on work

Battlespace

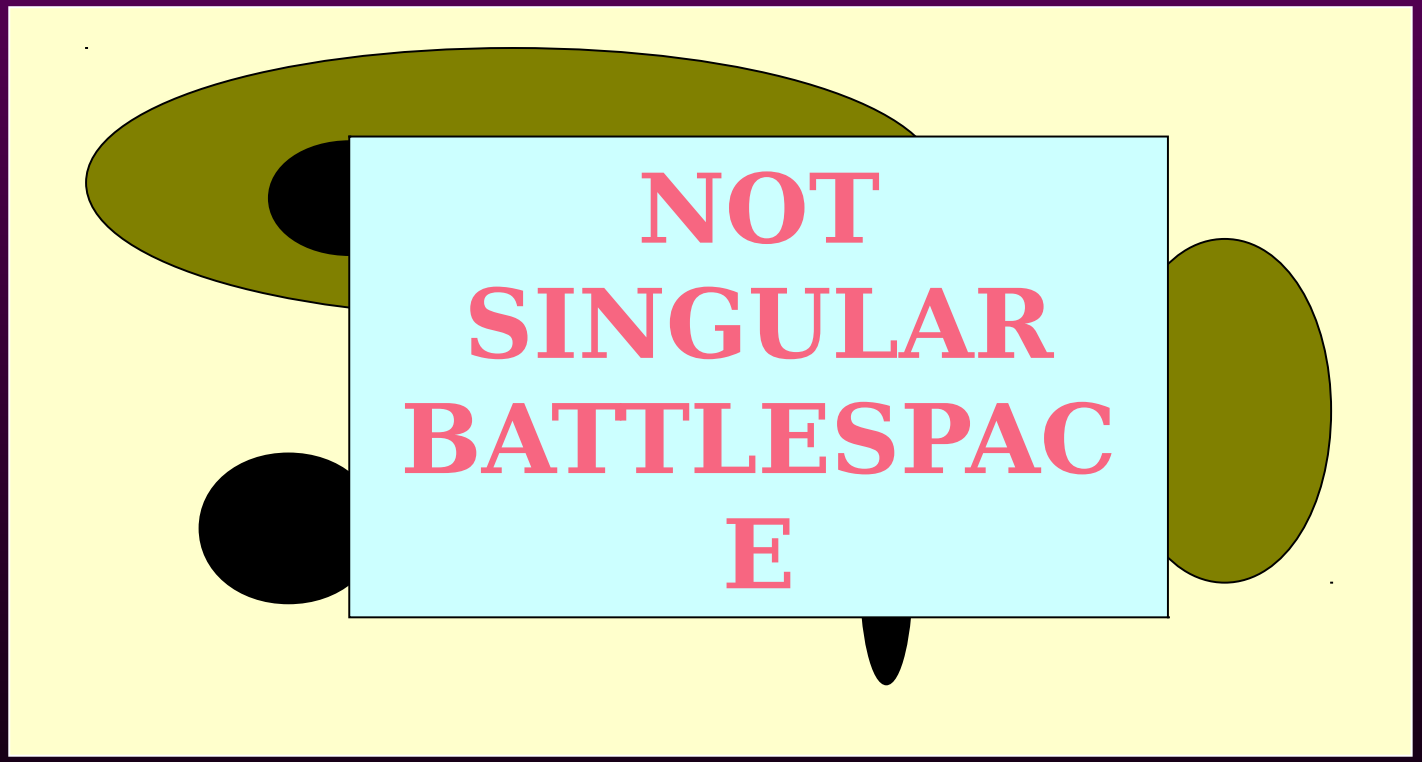
- Old Jominian Battlespace construct





Battlespace

- New Battlespace construct



Battlespace

- Physical frame of reference
- Resolution determined by viewing through:
  - 7 dimensions of Strategic Environment
  - 6 dimensions of Battlespace
- These may either reinforce or cancel out
- Final determination might depend on commander
  - Experience, intuition, etc

Battlespace

- Why different resolutions?
  - Complex terrain
    - Urban, jungle, mountain
    - Red/White confusion, signal degradation
  - Enemy actions
    - Deception, decoys, ECM, intrusion
  - Blue capabilities
    - Doctrinal, technical & cultural differences
    - Ineffective C&I

Future Environment - UK Armed Forces

- Should be optimised for new battlespace
- Lighter, more agile and mobile
- Still focused on warfighting
  - But wide range of other operations
  - Possible “3 block war”

Future Environment - Multinational

- Operations likely to be in ad hoc coalitions as well as established alliances
- Wide range of technical abilities
- But culture, structure, procedure and training as important

Future Environment - Constraints

- Public tolerance to all casualties, collateral and environmental damage will reduce
- Legal imperatives will increasingly constrain freedom to operate and train
- Adversaries not so constrained

Future Environment - Technology

- Critical path
- But must prevent overload of commanders and staffs
  - Efficient Knowledge and Information Management (KIM) required
- Need to harmonise technology, doctrine, training and structures to deliver significant advantage

EFFECTS BASED OPERATIONS

Future Operations - Effects Based Operations

- **ENDS** - Objectives (What)
- **WAYS** - Combination of MEANS, will and approach to achieve ENDS (How)
- **MEANS** - Capabilities available (Who)

Future Operations - Effects Based Operations

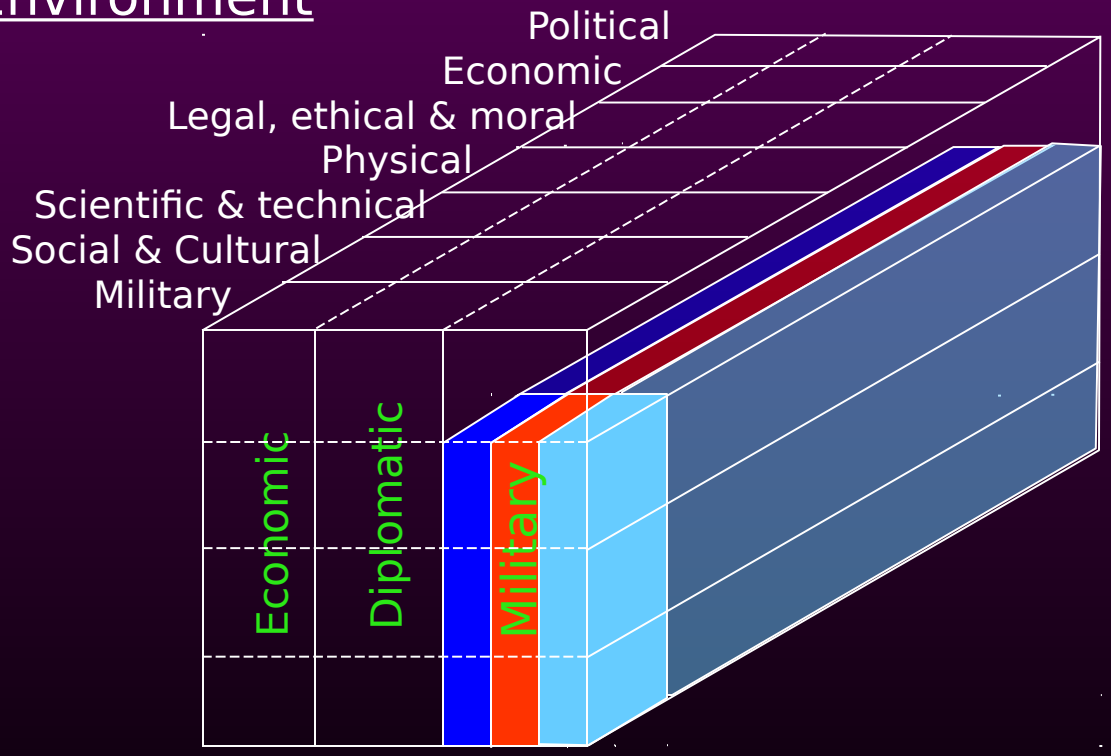
- **EFFECT** - Cumulative consequence across strategic environment of one or more actions taken at any level with any Instrument of Power
  - On any actor
  - On one or more dimension
  - Intended, unintended, desired, undesired, expected, unexpected, positive, negative
  - On will and/or capability

Future Operations - Effects Based Operations

- 2 types of effects :
  - Decisive
    - Key EBO/EBP output
    - Key strengths and weaknesses
  - Enabling
    - Required to enable decisive effects
    - e.g. shaping, deception
- 2 qualities of effect:
  - Timeliness
    - Not just speed of action
  - Duration
    - Sort and sharp or over time

Future Operations - Effects Based Operations

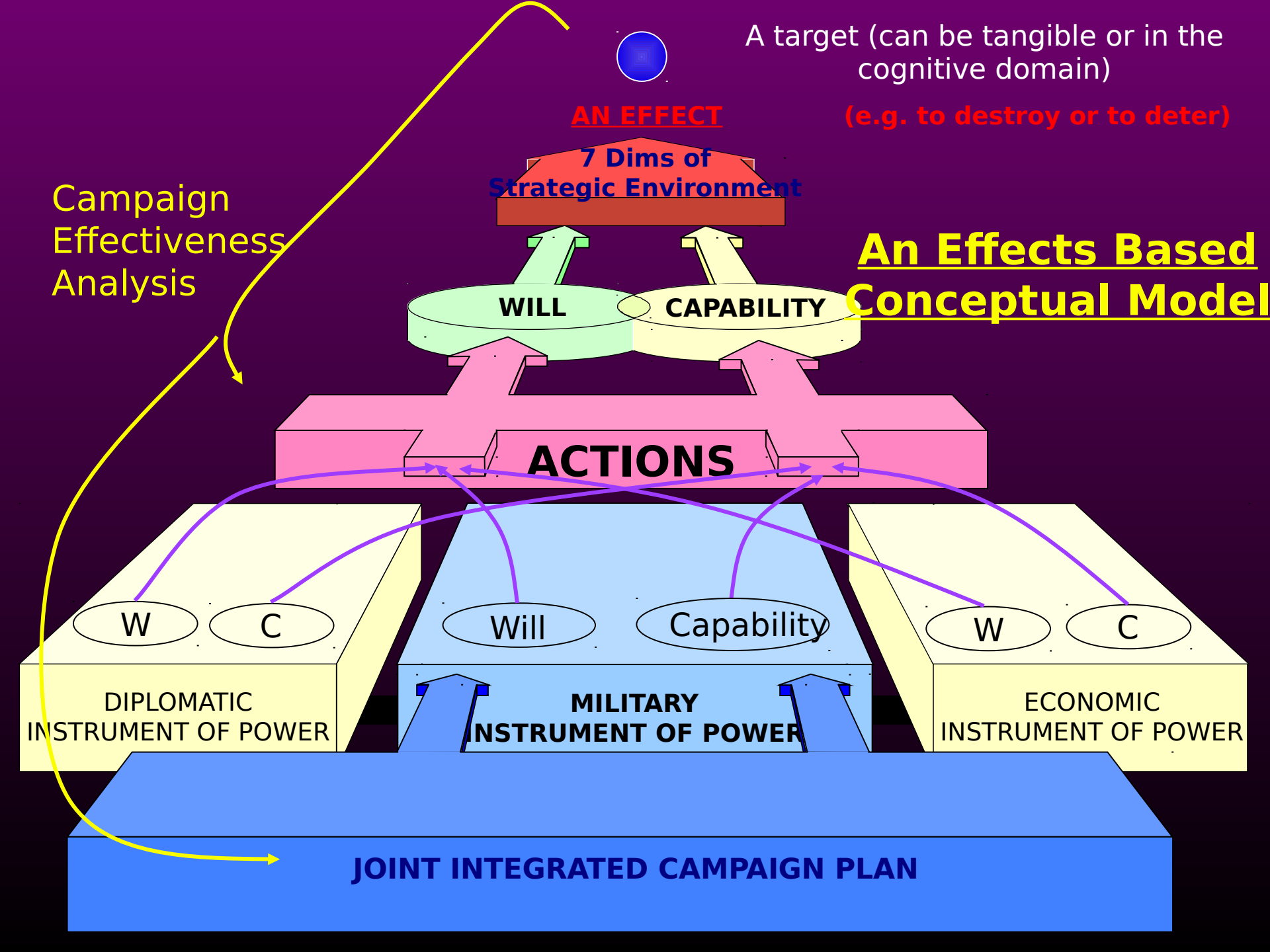
7 Dimensions of the Strategic Environment



Instruments of Power

Levels of Operation

- Grand Strategic
- Strategic
- Operational
- Tactical


A target (can be tangible or in the cognitive domain)
AN EFFECT
(e.g. to destroy or to deter)
7 Dims of Strategic Environment
Campaign Effectiveness Analysis
An Effects Based Conceptual Model
WILL
CAPABILITY
ACTIONS
W
C
Will
Capability
W
C
DIPLOMATIC INSTRUMENT OF POWER
MILITARY INSTRUMENT OF POWER
ECONOMIC INSTRUMENT OF POWER
JOINT INTEGRATED CAMPAIGN PLAN

Future Operations - Effects Based Operations

- **EFFECTS BASED APPROACH**

  - Cross Governmental (Inter Agency) determination of Grand Strategic Objectives

- **EFFECTS BASED OPERATIONS**

  - Military Planning and Operations in support of Strategic Objectives

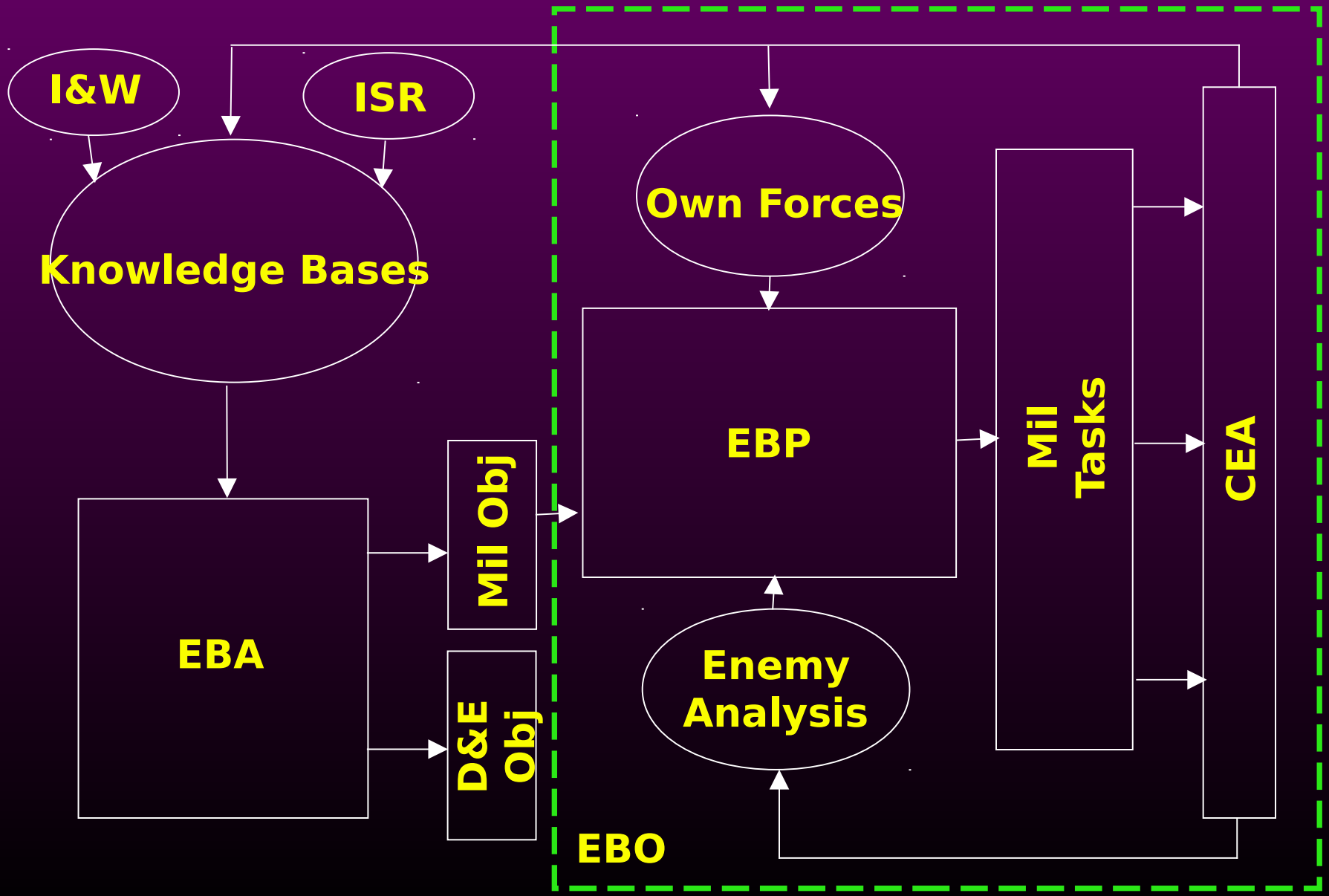
- **EFFECTS BASED PLANNING**

  - Translation of Military Strategic Objectives into Military Operations

- **EFFECTS BASED TARGETING**

  - Selection of targets and matching appropriate response to achieve desired effect

Future Operations - Effects Based Operations



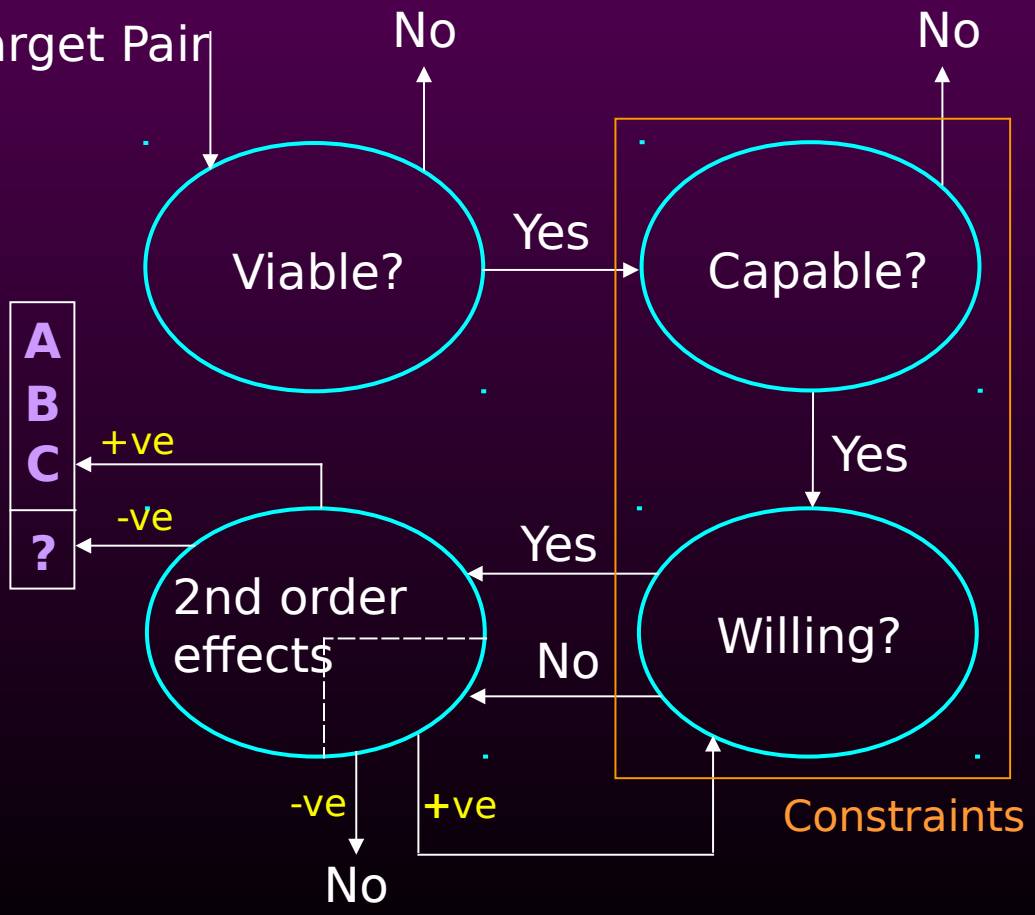
Future Operations - Effects Based Plannin

- Effects Based Planning
  - Based on a lexicon of effects
    - *Encourage, reassure*
    - *Influence, persuade, dissuade*
    - *Prevent, deter, coerce*
    - *Disrupt, isolate, degrade*
    - *Disable, destroy*
- Complex process
  - Sophisticated decision aids and IT support

Future Operations - Effects Based Plannir

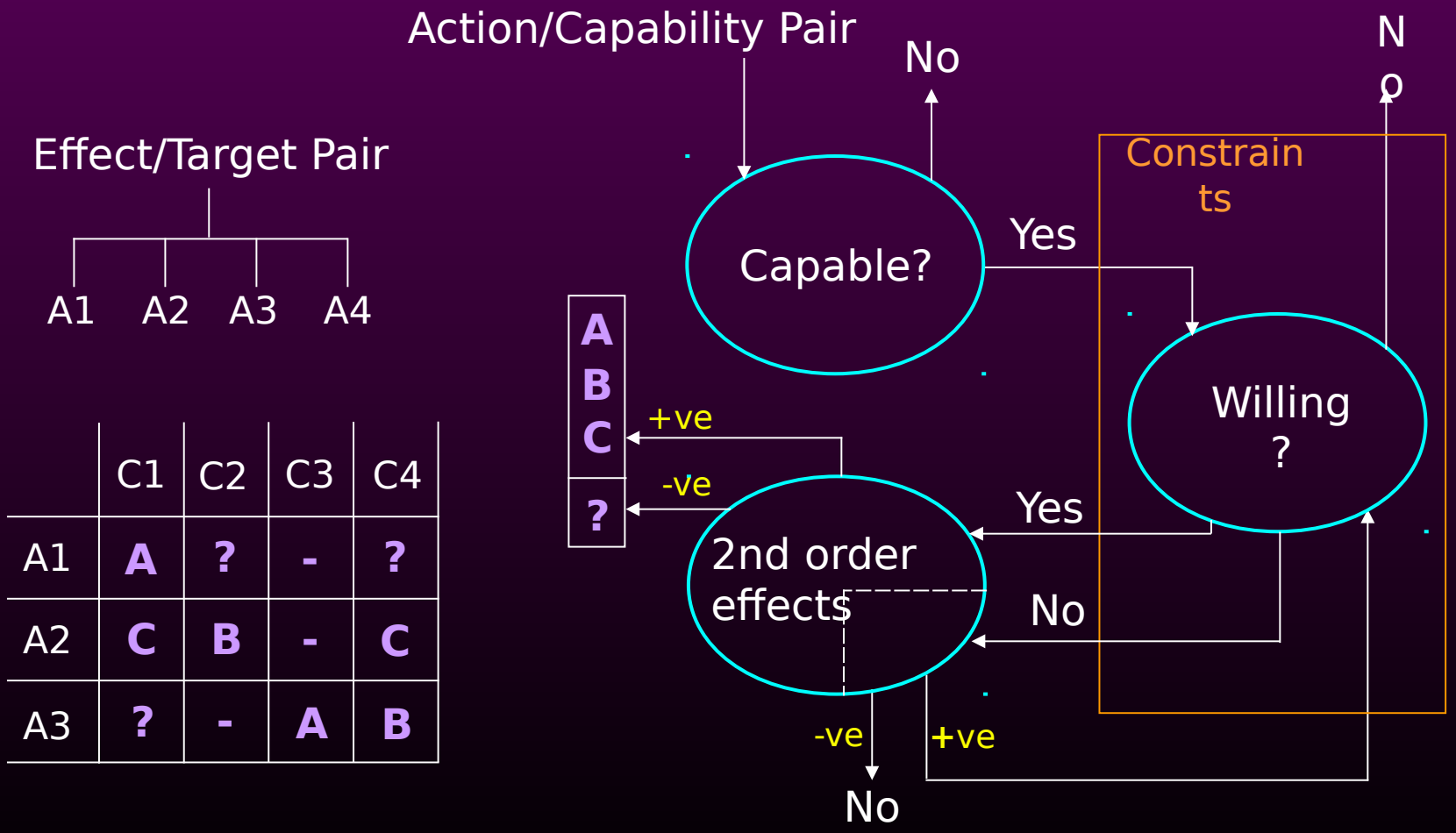
- Stage 1: Utility of Effects

	T1	T2	T3	T4
E1	**A**	**?**	**-**	**?**
E2	**C**	**B**	**-**	**C**
E3	**?**	**-**	**A**	**B**



Future Operations - Effects Based Plannin

- Stage 2: Selection of Capability/Effector



	C1	C2	C3	C4
A1	**A**	**?**	**-**	**?**
A2	**C**	**B**	**-**	**C**
A3	**?**	**-**	**A**	**B**

Future Operations - Network Enabled Capability

- **NETWORK ENABLED CAPABILITY** - "Linking sensors and decision makers and weapons systems so that information can be translated into synchronised and overwhelmingly rapid effects"
- Intention is to give common understanding of operational context and prevailing tactical situation and implications to - leaders

SHARED SITUATIONAL AWARENESS

Future Operations - Mission Command

- **SSA** and **Command Intent** enable force elements to seize fleeting opportunities and to cross boundaries
  - Environmental and functional
- Tension with need for precise effects
  - Implies degree of control
- Need for **Adaptive C2** to realise

Mission Command in the Information Age

Future Operations - Mission Command

- Empower
  - *Command Intent – rich but unambiguous*
  - *Use information to exploit & create opportunities*
  - *Minimise control – it takes time*
- Synchronise
  - *Strategic, Operational goals with Tactical activity*
  - *The objective of control is to contribute, not to interfere*
- Adaptive C2

Mission Command in the Information Ag

Future Operations - Constraints/Vulnerabilities

- Complete picture, even of Blue, never realisable
- Political imperatives will impose time constraints
- “Fog of war” will still exist
- Blue will gain advantage by degrading Red C&I capability
- Blue similarly vulnerable
  - Intrusion/deception
  - Increased expectations

Future Ethos - Agility

- Agility core of future operations
- Four attributes
  - Responsiveness
  - Robustness
  - Flexibility
  - Adaptability
- Agility suggests speed and proactivity
  - But could also allow mass from dispersal if necessary

Agility: People, Process, Equipment & Structures

Attributes

- Responsiveness
  - *Speed of reaction (to the unexpected)*
- Robustness
  - *Capable of multiple missions*
- Flexibility
  - *Multiple paths to success (unpredictability)*
- Adaptability
  - *Learning & adapting (to the unexpected)*

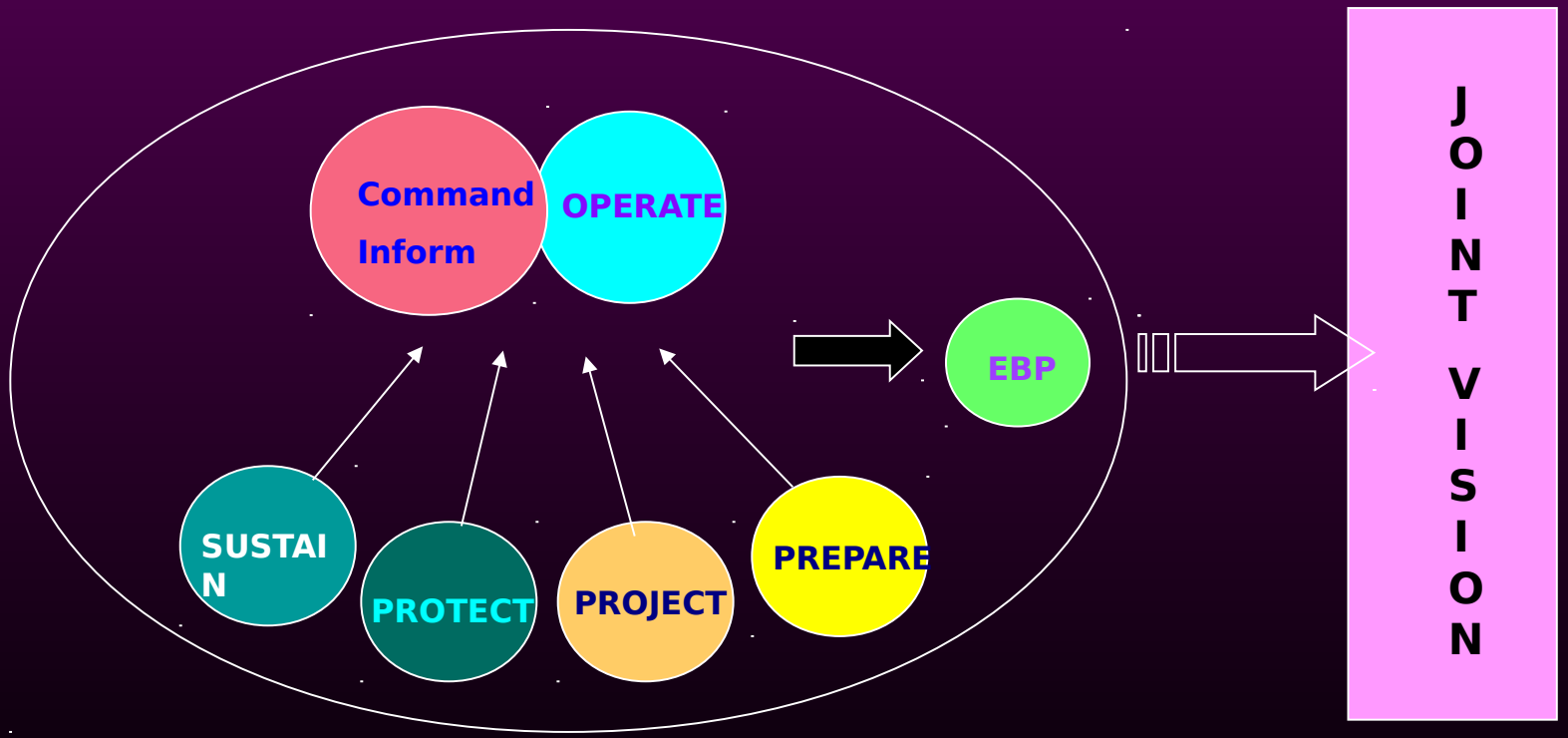
Future Ethos - Optimum Tempo & Persister

- Aim is to achieve Decision Superiority
  - To gain and maintain initiative
  - Ultimate is pre-emptive self-defence
- High Tempo gets inside Red decision-action cycle
- But Tempo is “speed within context”
  - Timing often more important than time
  - Could wait for high grade information
- Overall effect reinforced by Persistence
  - Maintenance of effect over time

UK High Level Operational Concept

Developing the

UK High Level Operational Concept



COMMAND

Command

- Introduction

- Understand
- Plan
- Integrate
- Control

The Command Core Concept

Mission Command relevant to the Information Age

Optimum tempo from creativity and initiative of well informed subordinate commanders

Underpinned by network-wide expression of Command Intent and Shared Situational Awareness

An agile joint force empowered to exploit and create opportunities

Adaptive C2 that reduces the tension between freedom of action and alignment of strategic and operational goals, expressed as synchronisation

Command - Introduction

- Command is assignment of authority
- Prerequisite for exerting control
- Probably error to extend C2 to C4
- Need new ideas for information age
- Current C2 linear, mechanistic and hierarchical
  - Inhibits timely processing of information
  - CEA not optimised for non-kinetic effects
- Need more flexible structures

Command - Introduction

- NEC offers potential for “Adaptive C2”
  - Control from high level to get precise effect
  - But must guard against “interfere-forward”
- Force packaging more flexible
  - But limited by need to maintain formed entities
  - Unit cohesion and trust must not be sacrificed in headlong rush for agility
- HQ Structures
  - Are J1-9 still useful ?

Command - Introduction

- Key to resolving tension is Command Intent
  - Much richer than at present
  - Generated through collaborative planning
- This plus SSA should permit synchronisation of force elements
- Higher levels only take control to re-establish synchronisation
- Training bill increased
  - Lower levels major on decentralised
  - Higher levels on when to revert to centralised

Command - Understand

- Commanders must have confidence and flexibility to exploit opportunities
- Also need to permit subordinate freedom of action
- Will require training to develop commanders who are comfortable with chaos

Command - Plan

- EBP must be collaborative
  - Commanders and staffs at all levels interact to produce plan
  - Important element of SSA
    - Can lead to “self-synchronisation”
- Reconfigurable task groups tailored to mission
  - Unpredictable assembly patterns
  - Logistic support implications
- CEA critical element
  - Commercial best practice might be used

Command - Integrate

- Armed forces will need ability to operate alongside other forces with wide range of capabilities and cultures
- 3 levels envisaged
  - Integrate — Interchange
  - Interoperate
  - Deconflict — Conflict

Command - Integrate

- Not just technology, also organisational, doctrinal, cultural barriers
  - *'UK Armed Forces will require commanders and staffs who have the patience, tact, flexibility and cultural empathy needed to minimise the drag on tempo'*
- Correct balance needs to be found
  - Key must be to retain unity of effort as minimum
  - With unity of command if possible

Command - Control

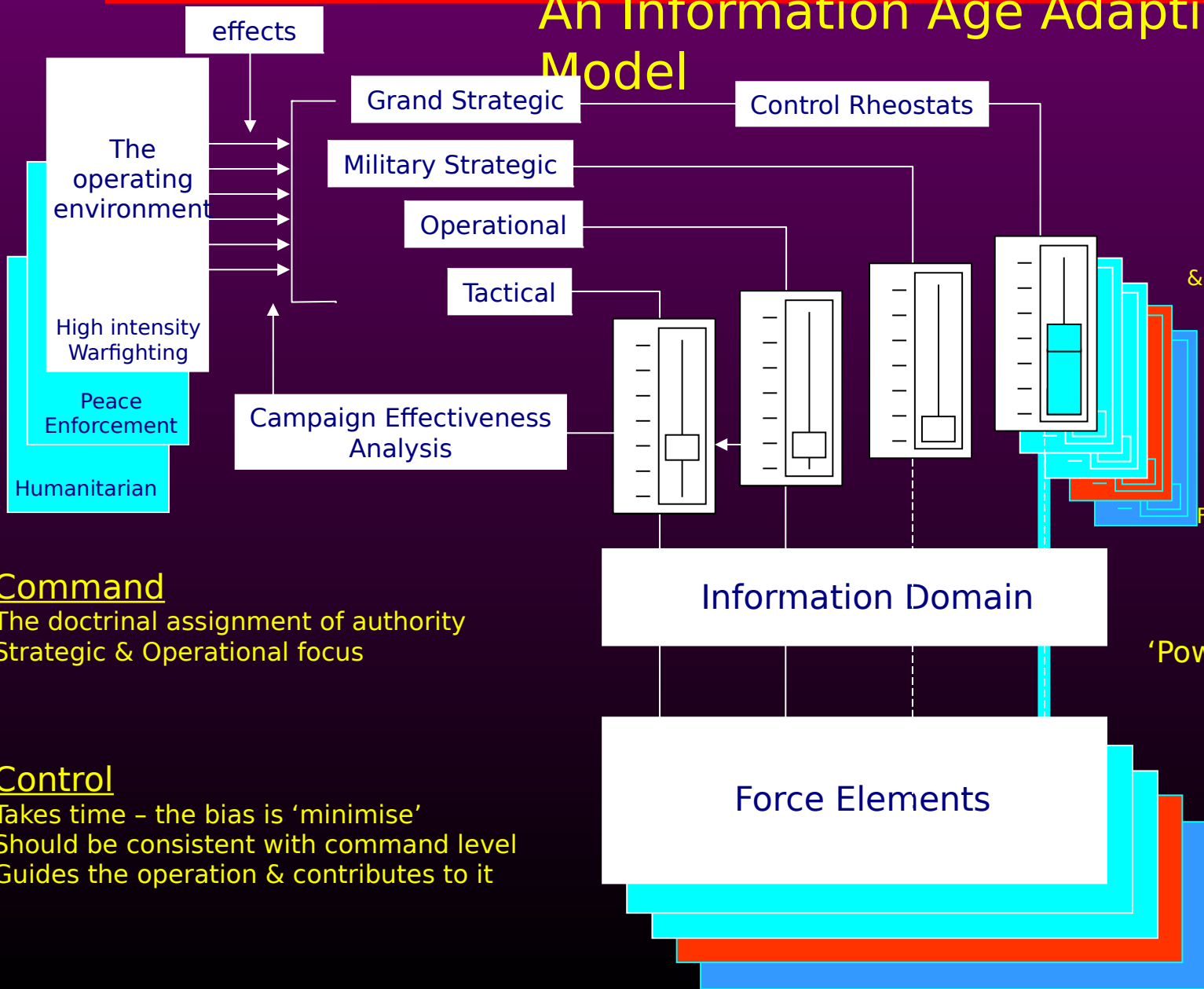
- Control should contribute, not interfere
- Future control should maintain alignment of strategic and operational goals
  - Most likely caused by imperfect interpretation of intent
- Potential for flatter C2 models
  - But must distinguish between function of command and mechanism of control

Command - Control

- Reduced size HQs offer benefits
  - Modular design
  - Smaller, dispersed footprint
  - Lower individual logistic burden
  - Higher speed of information transfer
- But Multinational operations may demand retention of more traditional structures

Command - Control

An Information Age Adaptive C2 Model



Command
The doctrinal assignment of authority
Strategic & Operational focus

Control
Takes time – the bias is 'minimise'
Should be consistent with command level
Guides the operation & contributes to it

INFORM

Inform

- Introduction

- Gain
- Analyse
- Exploit
- Disseminate
- Maintain

Inform - Introduction

- Current systems compartmentalised
- Info Management has not kept up with technology
- Inform must enable
  - EBO
    - Knowledge Bases
    - Value Sets
    - CEA
  - Decision Superiority
    - SSA
- Requires deeper richer information

Inform - Introduction

- Ideal is access to all information by all
  - Reality of physics and finance suggest otherwise
- So structure environment to get minimum information for SSA to those who need it
  - Detail required will vary enormously by level
- Configure battlespace into Communities of Interest

Inform - Introduction

- Communities of Interest
  - Military Strategic planners
  - Task Groups
  - Pre-determined sensor shooter groups
- Reconfigurable almost at will
  - Not anarchy
  - Rapid coalescence
- Intelligent push and pull of information
  - Current all-push paradigm replaced
  - Users state requirements

Inform – Wider & Deeper

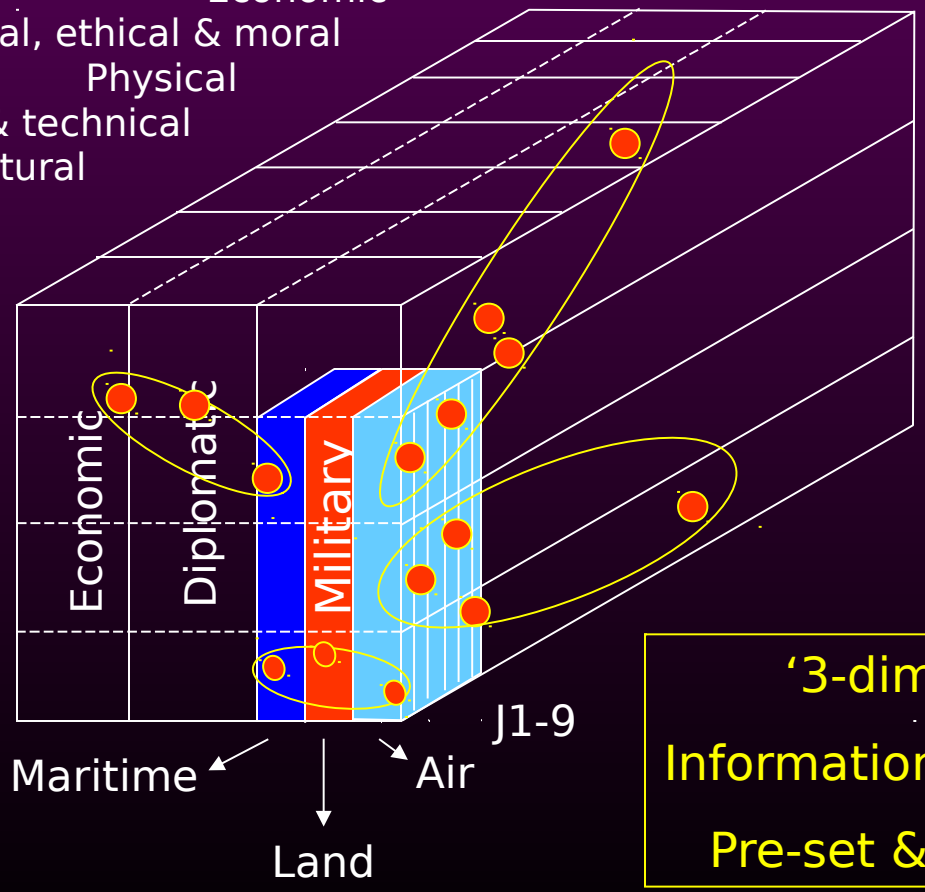
7 Dimensions of the Strategic Environment

Political
Economic
Legal, ethical & moral
Physical
Scientific & technical
Social & Cultural
Military

Levels of Operation

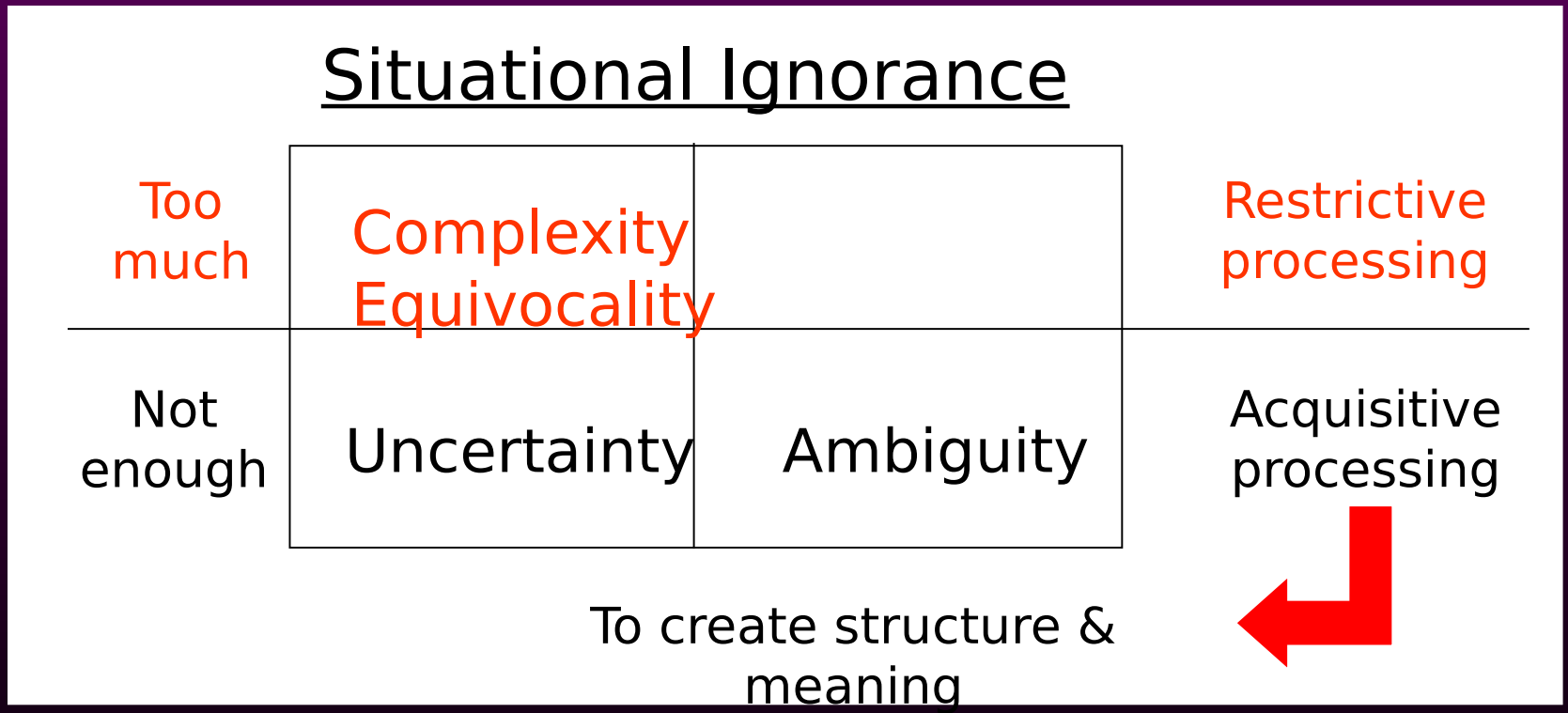
Grand Strategic
Strategic
Operational
Tactical

Instruments of Power



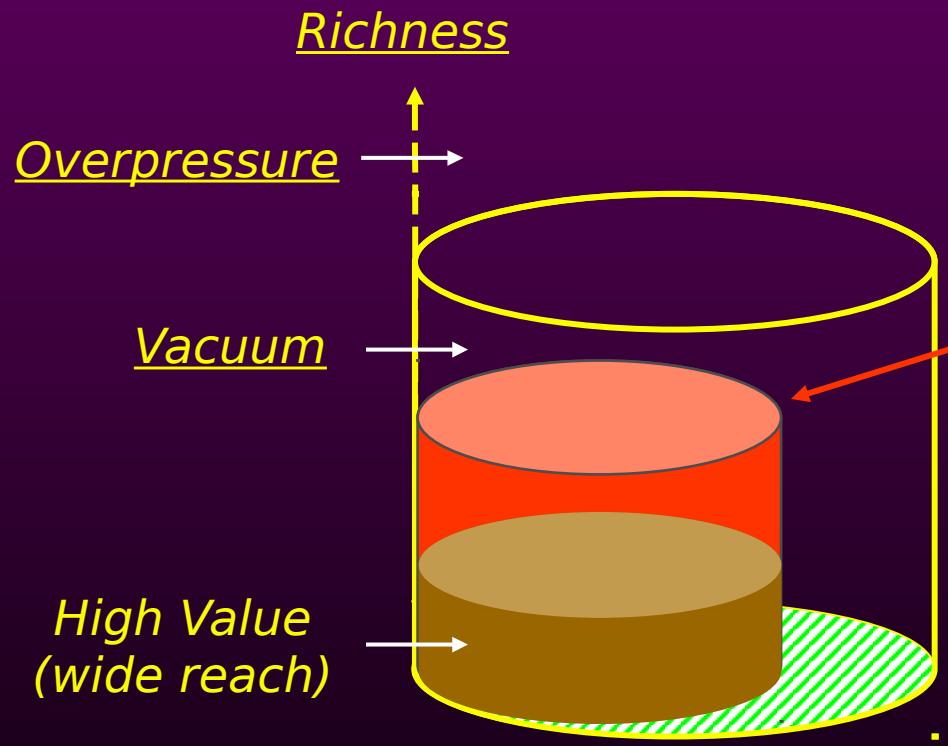
‘3-dimensional’
Information Communities
Pre-set & self-forming

Vulnerabilities



Inform - The Information Requirement

Precision & accuracy, currency, timeliness, assurance, completeness



Information Requirement

Information Position

(always imperfect)

Quality of Interaction

Voice, data, text,

static & dynamic images,

degree of delay

Reach

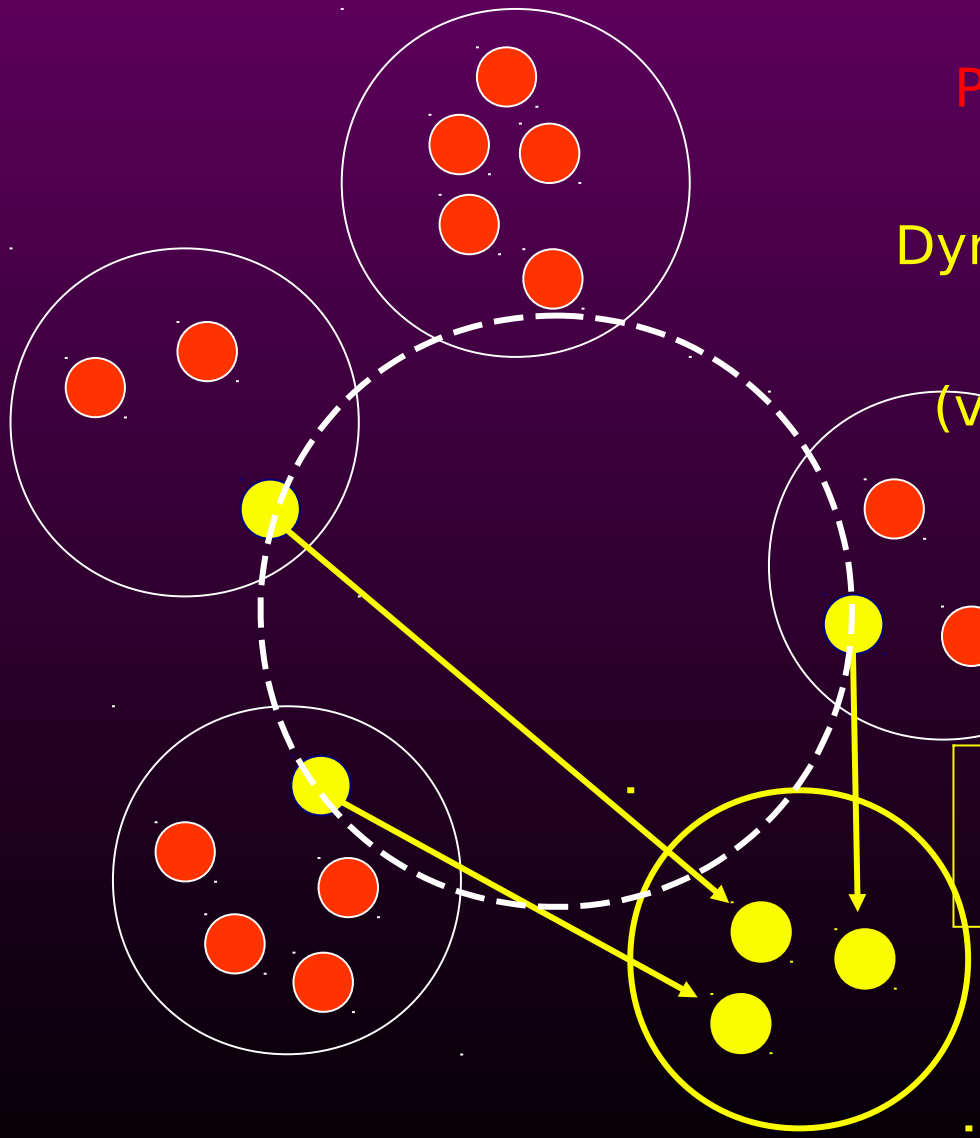
Geography, range, continuity, cross-component & echelon,

cross-coalition, cross-functional areas

Inform - Introduction

- Single information domain required
- Only manner in which all information can be made available to all CoIs who need it
- Will need massive culture change
  - Particularly from Intelligence community
- Technology suggests will be possible
  - Meta-data tags
  - Individual ID techniques

Inform - Communities of Interest



Pre-set Information Communities

Dynamic Community of Interest

(virtual collaborative planning)

Physical Reconfiguration

(Task oriented agile group)

Inform - Gain

- UK cannot afford permanent global watch
  - Global Scan, Regional Watch
- Once focused, detailed information to furnish EBP requirements
  - Knowledge bases
  - Value Sets
  - CEA
- All information potentially valuable at all levels

Inform - Gain

- Information on Red will come from ISR
- Blue Information derived from automated position, status and intention reports
- White information produced from a mixture of the two
- Sum is basis of Combat ID

Inform - Analyse

- Some raw data of immediate utility
- But much will require processing within specialisation
  - Agility demands early access by others
  - So not released as completed packages
- Demands good formatting and indexing
  - If not, correlation difficult
  - Human input important

Inform - Exploit

- Initial CoI determined by EBP
- Primed by “push” of information
  - Must contain Command Intent and context

Inform - Exploit

- Important tool is Joint Operational Picture
  - Current definition:

"Total set of shared information…available through a secure information environment…to support SSA and decision-making"

- Need for "enhanced JOP"
  - Access all components of DCF
  - NRT Common Operating Picture plus predictive and replay capability
- Would aid development of multiple COA

Inform - Disseminate

- Architecture must be joint, reliable, robust, secure
- Interoperable/Integrated as required
- Likely to be federated
- Must be based on commercial protocols and standards to avoid early obsolescence
- Only restrictions on access must be basis of classification, sensitivity or granularity
- Reachback should reduce footprint
- Reintroduction of formal messaging processes

Inform - Maintain

- Information Assurance essential
  - Networks magnify vulnerability
- Audit facility
  - Support Info Campaign
    - Establish legitimacy of military action
      - Particularly if pre-emptive
    - Rebut media assertions

OPERATE

Operate

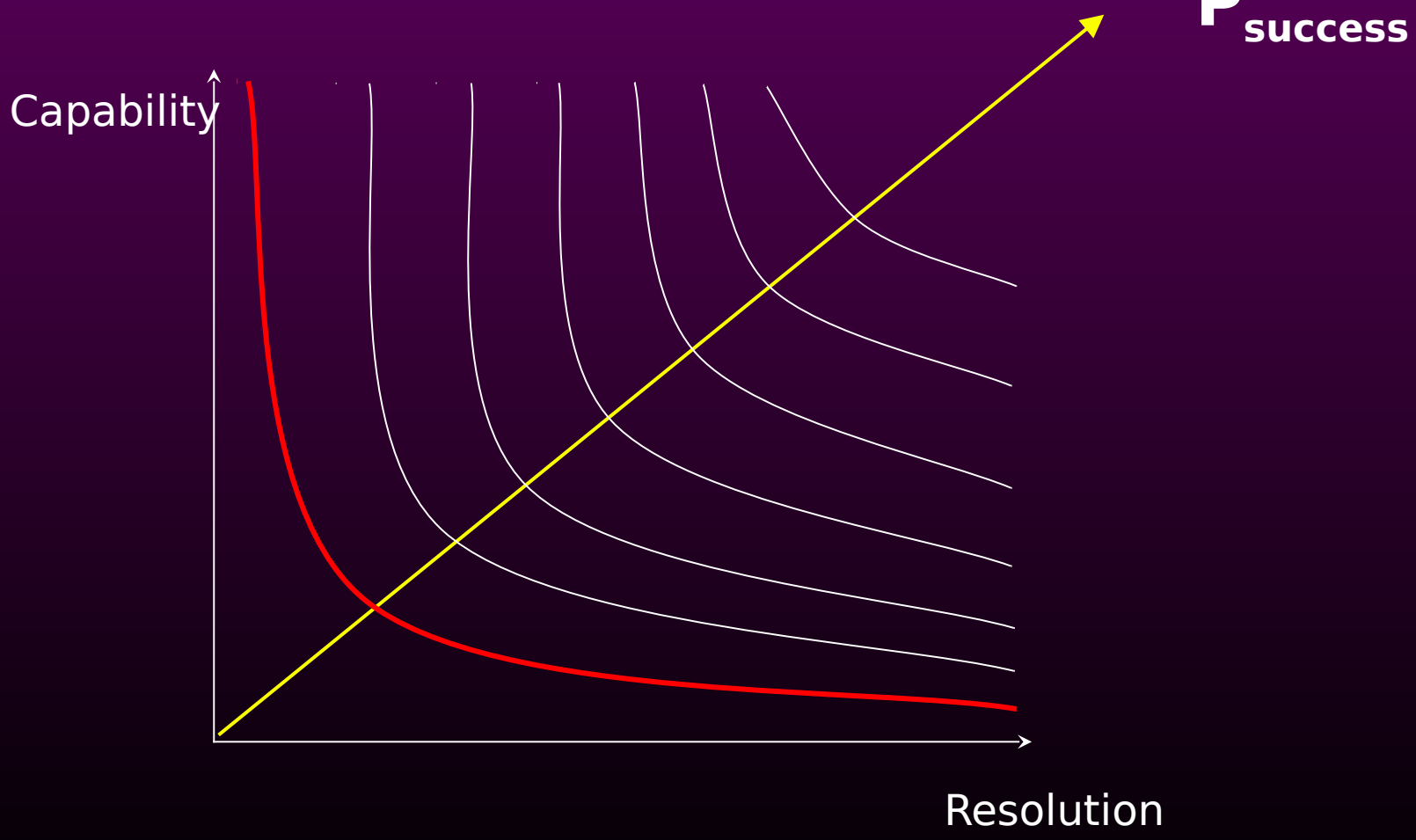
- Introduction

- Manage Battlespace
- Manoeuvre
- Apply Effects

Operate - Introduction

- Operate = execution
- Need collaborative execution as well as planning
  - Demands good SSA
  - What about low resolution?
- Despite differing resolutions
  - Single doctrine
  - Multiple TTPs

Operate - Introduction



Operate - Manage battlespace

- Availability of SSA should permit synchronisation of force elements
  - Thus reduced need for “management”
  - Elements deconflict by exception
  - Commanders decide if required

Operate - Manage Battlespace

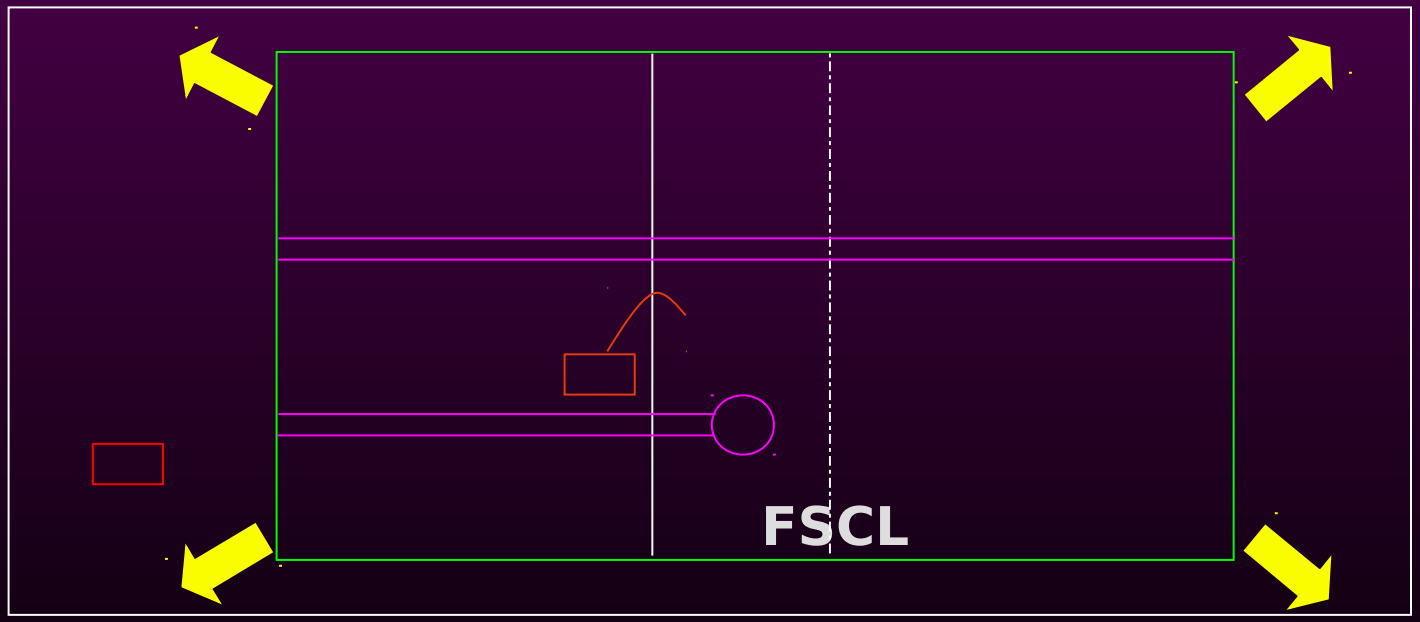
- High resolution:
  - Good SSA
    - “Enhanced JOP” and understood Command Intent
    - Gives “picture” and “plan”
  - Permits collaborative planning & execution
  - Pre-scripted responses available
    - Reduces cognitive requirement
    - Increased Tempo
  - Optimised CEA
    - Feedback into planning

Operate - Manage Battlespace

- Low resolution:
  - Poor SSA
    - No or poor “Enhanced JOP” available
  - Mission Command only solution
    - But collaborative planning in advance possible
    - Commanders will retain close link during execution
  - So external assistance available
    - But using procedural/positive control
  - More cognitive activity required
    - Decreases Tempo

Operate - Manage Battlespace

- Old Battlespace construct

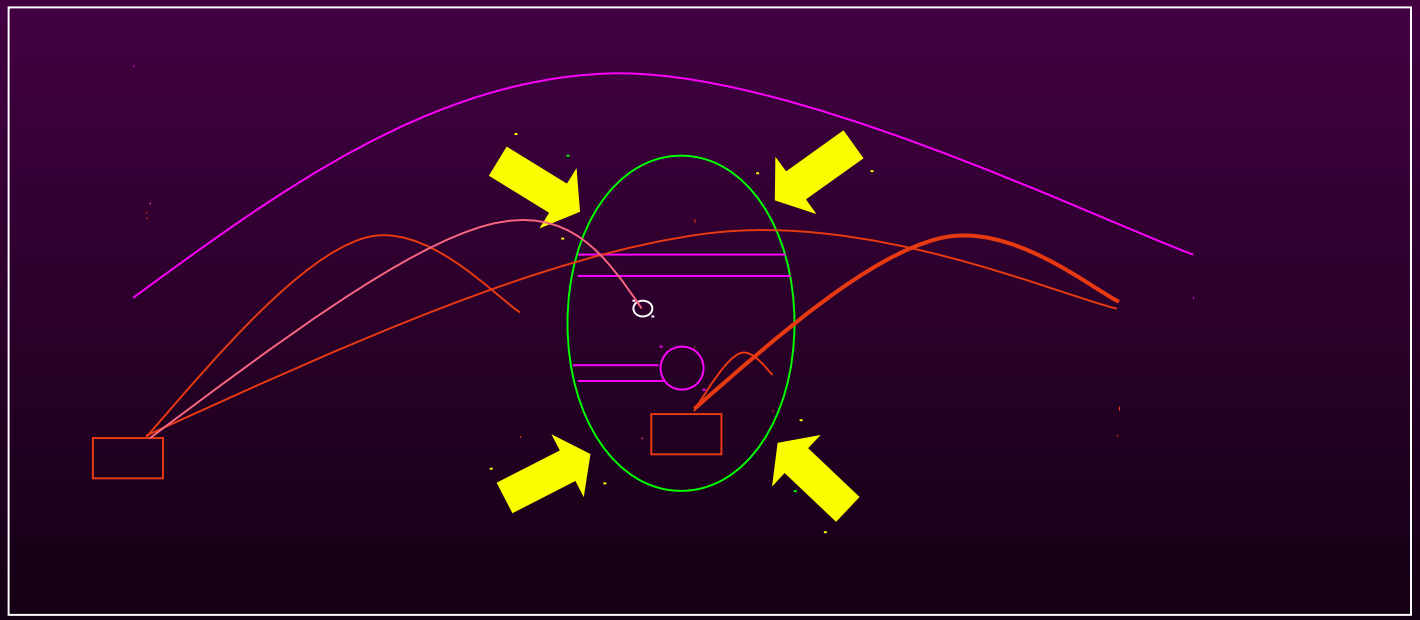


Operate - Manage Battlespace

- New Battlespace construct - High resolution

Operate - Manage Battlespace

- New Battlespace construct - Low resolution



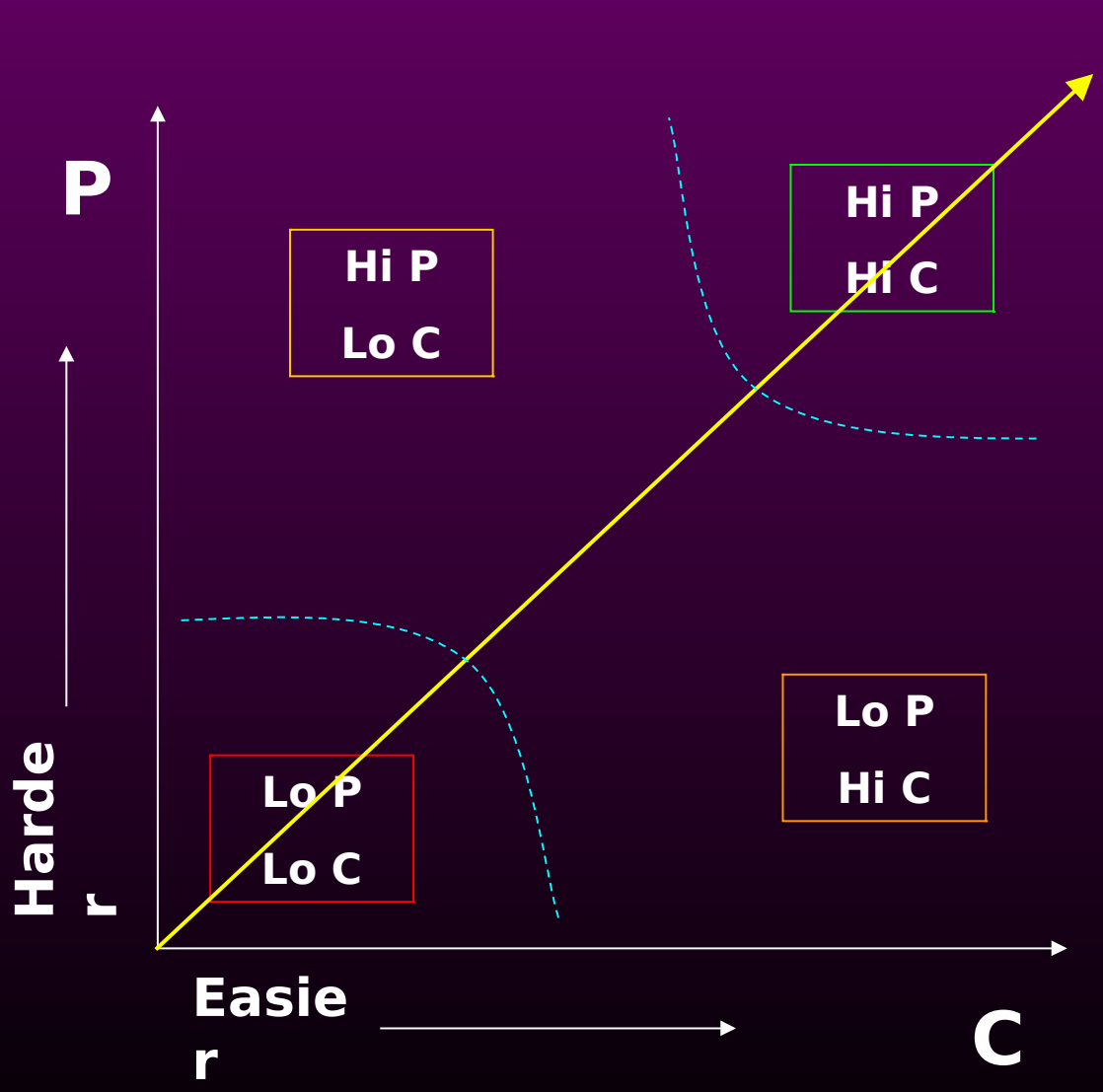
Operate - Manoeuvre

- Aim to get into position of advantage
  - Either cognitive or physical
- Comparison of Resolved Battlespaces seen through Blue/Red eyes
  - Operate in areas with better information position
  - Try to reduce areas where Red has advantage

Operate - Manoeuvre

- Reconfigurable Task Groups
  - Force elements dispersed within battlespace
  - Massing only for effect
- Implies ability to
  - Hit at a distance and/or Move swiftly to position
- High agility an essential part of equation
  - Ability to recognise need for reconfiguration
  - Ability to reconfigure

Operate - Manoeuvre



AGILITY

- Physical
  - Responsiveness
  - Robustness
- Cognitive
  - Flexibility
  - Adaptiveness

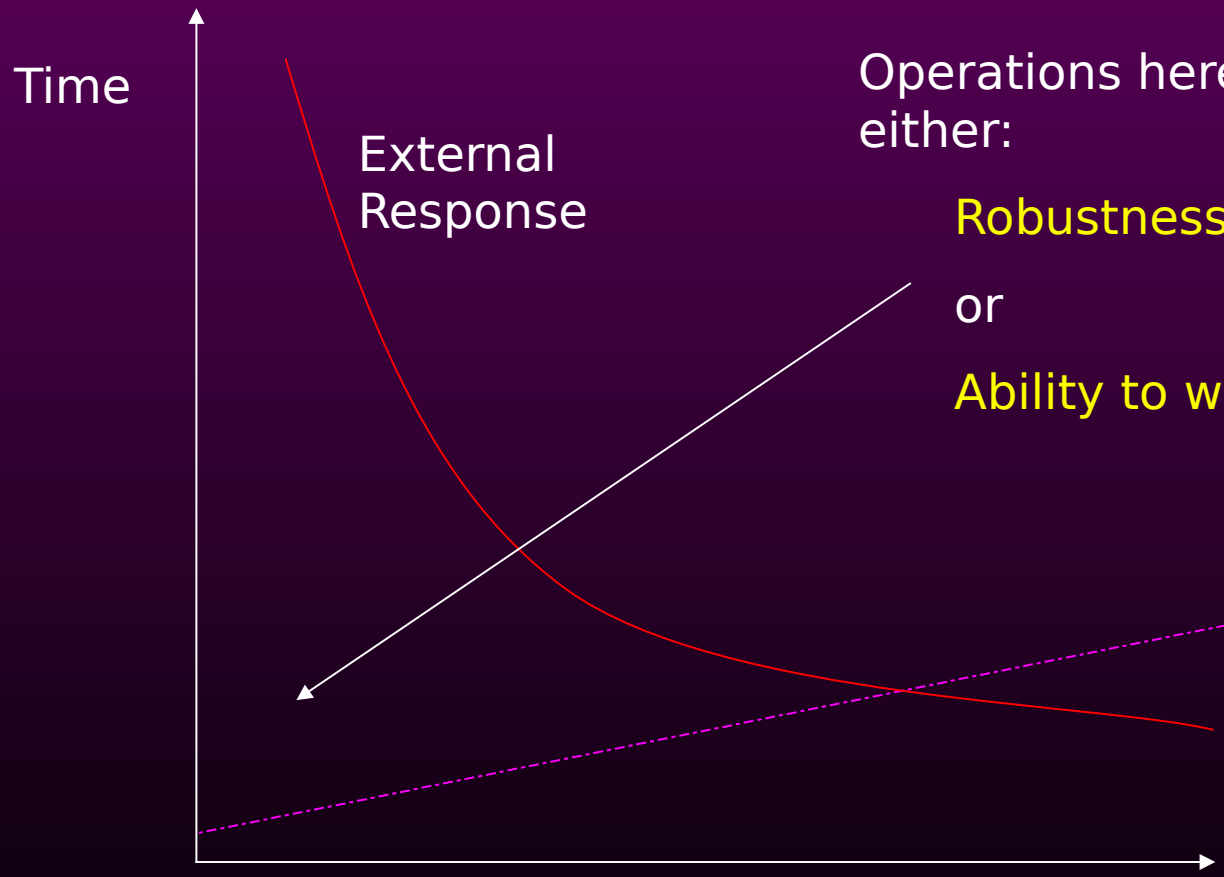
Operate - Manoeuvre

- Additional qualities must also be considered
  - Persistence
    - High resolution - multiple short term actors or presence
    - Low resolution - presence required
  - Commit-to-effect time
    - Becoming ever more important
    - Maximum acceptable time likely to vary with resolution

Operate - Manoeuvre

- Staffs will have to judge best force/resolution mix
- Set rules too simplistic
- Factors could include:
  - Relative force capability vs. resolution
  - Availability & timescale of external assistance
- Likely to be human decision
  - Operational art, not military science
  - Risk management

Operate - Manoeuvre



Operations here require either:

Robustness

or

Ability to withdraw

Maximum Commit-to-Effect time

Operate - Apply Effects

- 2 types of effects :
  - Decisive
    - Key EBO/EBP output
    - Key strengths and weaknesses
  - Enabling
    - Required to enable decisive effects
    - e.g. shaping, deception
- 2 qualities of effect:
  - Timeliness
    - Not just speed of action
  - Duration
    - Sort and sharp or over time

Operate - Apply Effects

- Agility important overall
- Persistence plays a major role in low resolution
  - Timeliness
    - In place
  - Duration
    - Only solution

Operate - Apply Effects

- Target Acquisition
  - Strategic and Operational level
    - From EBO/EBP fed by CEA
  - Tactical level
    - High resolution
      - Good SSA available
      - Less cognitive requirement
      - Granularity/latency issues
    - Low resolution
      - Poor SSA
      - More cognitive involvement
      - Drag on tempo

Operate - Apply Effects

- Target Attack
  - Perhaps the easiest part!
  - Demands precision
    - Space
    - Time
    - Commit-to-effect time
  - But precision in context
    - Effect, not necessarily weapon

Summary

- The future – complex & uncertain
- New “Resolved” Battlespace paradigm
- EBO – wider & deeper information
- Agility – configuring for the unexpected
- C4 – making sense of C2 & technology
- Communities of Interest – building paths
- Mission Command in the Information Age
- Adaptive C2 – the ‘control rheostat’
- Interoperability – the cultural dimension
- Task-oriented forces
- Collaborative execution
- Precise effects

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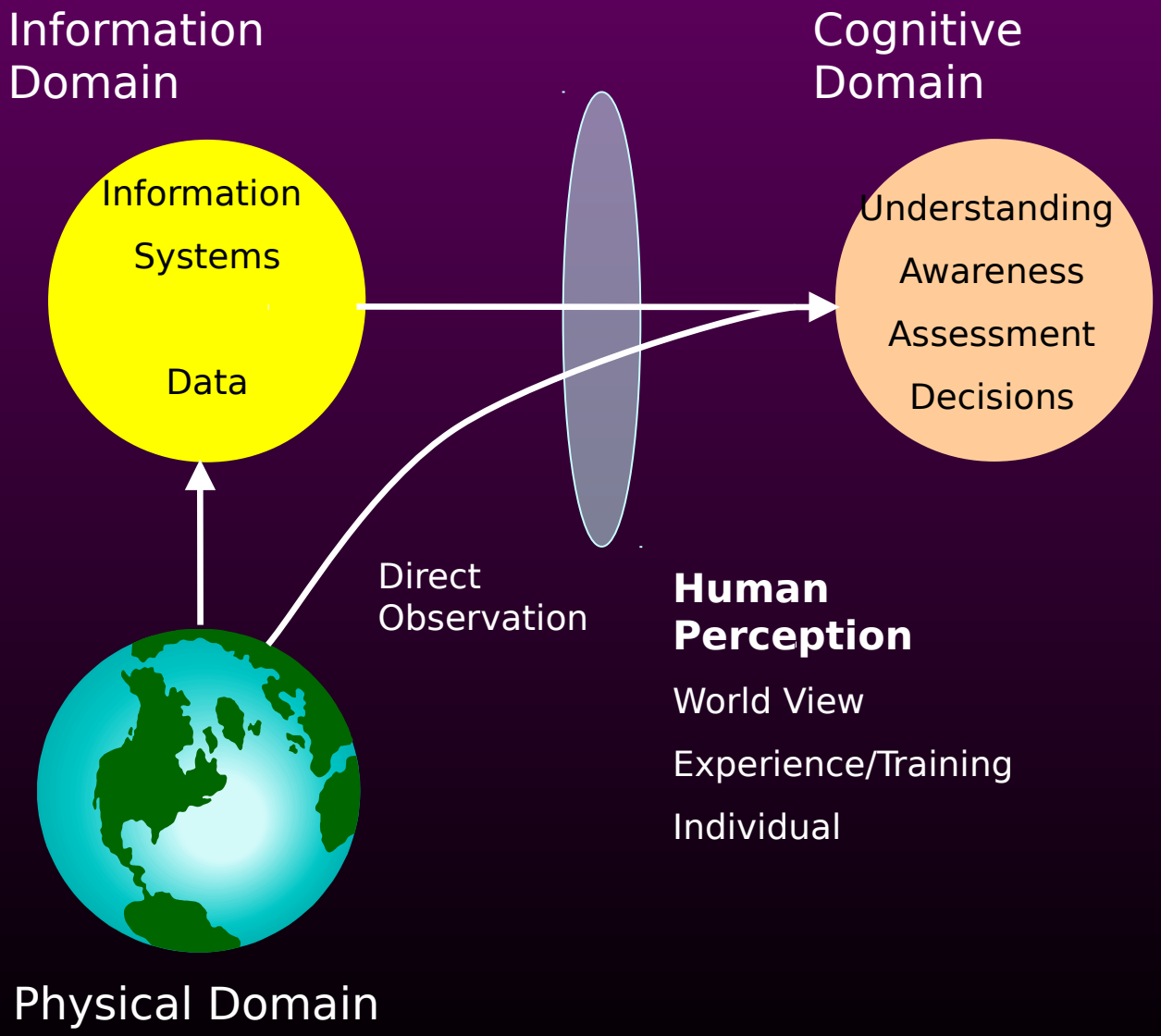
Information Theory

- Based on work of Drs Hayes & Alberts
- 3 Domains
  - Physical
  - Information
  - Cognitive

Information Theory



Information Theory